PATENT SPECIFICATION

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745,294

Date of filing Complete Specification: April 13, 1954. *No. 5874/53.*

Application Date: March 3, 1953.

Complete Specification Published: Feb. 22, 1956.

Index at acceptance:—**Class 47,** A9.

COMPLETE SPECIFICATION

Improvements in or relating to Fog-foam Nozzles

We, FIRE ARMOUR LIMITED, a British Company, of 9, George Street, Baker Street, London, N.W.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to fog-foam nozzles for fire-fighting apparatus and has for its object a nozzle of simple construction which will effectively produce a widely diverging stream of foam capable of covering a substantial area both forwardly and laterally of the nozzle axis without the necessity for varying the direction of the nozzle.

According to the invention a fog-foam nozzle comprises a tubular member terminating at its forward end in a head for generating fog-foam from a liquid containing a foam forming agent, a casing surrounding said fog generating head, said casing being open at its forward end and being apertured at its rear end for permitting the entrainment of air, and a propeller-like member rotatably mounted within the casing in advance of the fog generating head adjacent said forward end so as to produce a widely divergent stream of foam forwardly and laterally of the nozzle axis. The propeller-like member, against the blades of which jets of liquid impinge as they leave the fog head, is caused to rotate and part of the liquid is directed outwardly at a substantial angle to the nozzle axis in the form of a conical spray curtain of fine droplet size, while the remaining jets of liquid pass between the propeller-like blades and fill the interior of the cone. Preferably the blades are designed to produce deflection of the spray in the manner of a cone having an apex angle of about 45° and this deflected spray will thus cover an area of ground in the vicinity of the nozzle. That part of the liquid which passes between the propeller-like blades will have a higher velocity and, assisted by the flow of air induced through the apertures in the rear end of the casing, will be projected over a much greater distance from the nozzle.

An embodiment of fog-foam nozzle according to the invention is illustrated by way of example in the accompanying drawings wherein:—

Fig. 1 is a part axial section and part longitudinal elevation of the nozzle; and

Fig. 2 is a front elevation of Fig. 1 partly broken away for clarity of illustration.

In the drawings 10 designates a tubular pipe of progressively diverging cross-sectional shape having a coupling element 11 at its rear end by which it can be quickly connected to and disconnected from a supply hose (not shown) for the foam mixture. At its forward end the pipe 10 has removably secured thereon as by inter-engaging threads and with the interposition of a gasket 12 a fog-foam generating head 13. The front wall 14 of the head 13 is rearwardly and outwardly inclined at an angle of about 60° to its axis and is formed with inner and outer concentric depressions 15, 16. Each of these depressions is formed by three relatively angularly inclined annular wall portions in each of which there is provided an annular row of orifices 17*a*, 17*b*, 17*c* and 18*a*, 18*b*, 18*c* respectively, and as will be clear from Fig. 1 the orifices in the three rows of each of the two series converged forwardly of the head. The orifices in each series of rows are also arranged in radial alignment. There is also a further innermost annular row of orifices 19 which converge forwardly towards the head axis.

Also removably secured on the forward end of pipe 10 is a cylindrical casing 20 of considerably greater diameter than the head 13, the rear wall of said casing being clamped between the head and a shoulder on the pipe. This rear casing wall is provided with an annular series of apertures 21. Around

[*Price* 3/-]

the front end of the casing is a flange 22 to which is secured by bolts 23 the flanged rear end of a tubular member 24 having the same diameter as the casing and forming a forward extension thereof. The member 24 has secured thereto a series of radial stays 25 which at their inner ends are threaded into a boss 26 on which is rotatably mounted through the medium of a ball race 27, a four-bladed propeller-like member 28. The propeller-like member, which is located entirely within the casing member 24, has a diameter greater than that of the head 13, and holes 29 are provided in the blades at a distance from the nozzle axis approximately corresponding to the radial distance between the inner depression 15 in the fog head and the periphery of said head. The propeller-like blades are bolted together at 30 and to a central disc 31 located on a forward reduced diameter portion 26*a* of boss 26.

In operation the fog or fine mist created by the converging jets from orifices 17*a*, 17*b*, 17*c* and 18*a*, 18*b*, 18*c* surges forward and causes the propeller-like to rotate. Under this action a number of rotating helical sprays are produced which combine to form a conical curtain of fine liquid droplets having the maximum apex angle of about 90°. Some of this fog or spray passes through the holes 29 in the rotating blades and also between the propeller-like blades. The combination of these various actions produces a substantially filled cone of fog-foam over a wide area and extending up to fifty feet from the nozzle and having an angle of or approaching 90°. Such a nozzle arrangement would be of considerable advantage in the extinguishing of large areas of burning liquids from, for example, crashed aircraft.

The jet orifices in the fog head 13 may be of different sizes. For example the orifices 17*b*, 18*b* in the central row of each series may, as shown, be larger than those in the other rows, thereby ensuring that a sufficient quantity of liquid from each series of orifices is directed towards the path of rotation of the blades.

What we claim is:—

1. A fog-foam nozzle comprising a tubular member terminating at its forward end in a head for generating fog-foam from a liquid containing a foam forming agent, a casing surrounding said fog generating head, said casing being open at its forward end and being apertured at its rear end for permitting the entrainment of air, and a propeller-like member rotatably mounted within the casing in advance of the fog-foam generating head, adjacent said forward end so as to produce a widely divergent stream of foam forwardly and laterally of the nozzle axis.

2. A nozzle as claimed in Claim 1, wherein the propeller-like member is rotated by the liquid.

3. A nozzle as claimed in Claim 2, wherein the jet orifices are arranged in one or more series of rows, the orifices in the rows in the or each series converging in advance of the fog generating head.

4. A nozzle as claimed in Claim 3, wherein the orifices in the or each series are radially aligned.

5. A nozzle as claimed in Claim 3 or 4, wherein the orifices in the or each series are of different sizes.

6. A nozzle as claimed in Claim 1, wherein the propeller-like member is rotatable on a boss arranged axially of the nozzle and supported by stays carried by the casing.

7. A nozzle as claimed in Claim 6, wherein the blades of the propeller-like member are provided with holes.

8. A nozzle as claimed in Claim 6, wherein the casing is constructed in two detachably interconnected parts arranged axially one in front of the other, the forward part carrying the propeller-like member.

9. Fog-foam nozzle substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

For the Applicants,
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PROVISIONAL SPECIFICATION

Improvements in or relating to Fog-foam Nozzles

We, FIRE ARMOUR LIMITED, a British Company, of 9, George Street, Baker Street, London, N.W.1, do hereby declare this invention to be described in the following statement:—

This invention relates to fog-foam nozzles for fire-fighting apparatus and has for its object a nozzle of simple construction which will effectively produce a widely diverging stream of foam capable of covering a substantial area both forwardly and laterally of the nozzle axis without the necessity for varying the direction of the nozzle.

According to the invention a fog-foam nozzle comprises a tubular member terminating at its forward end in a head for generating fog-foam from a liquid containing a foam-forming agent, a casing surrounding said fog generating head, said casing being open at its forward end and having means at its rear end for permitting the entrainment of air, and a propeller-like member rotatably mounted within the casing in advance of the fog generating head. The propeller-like member, against the blades of which the fog-foam stream impinges as it leaves the fog head, is caused to rotate and a part of said stream is directed outwardly at a sub-

stantial angle to the fog head axis in the form of a cone, while the remainder of the stream passes between the propeller blades inside the cone. Preferably the blades are designed to produce lateral deflection of the spray through an angle not substantially exceeding 45° to either side of the nozzle axis.

In an embodiment of the invention which will now be described by way of example, a tubular member constructed for attachment to a supply hose carries at its forward end a fog head of known construction having a number of pairs of relatively angled passages arranged with the centre-lines of each pair intersecting in the manner of a V substantially at or forwardly of the nozzle surface. The pairs of passages are in one or more annular rows surrounding a central pair. Secured to the forward end of said tubular member and arranged axially thereof is a cylindrical casing of considerably greater diameter than that of the fog head. The casing is made in two parts of equal diameter having mating flanged ends by which they are adapted to be secured together. The rear casing part has an axial length corresponding approximately to that of the fog head and its flat end wall is formed with an annular series of apertures through which air is entrained by the nozzle action during operation. The forward casing part comprises a plain cylindrical wall providing a forward open end through which the liquid stream is projected. Within the forward casing part there is secured a diametrical stay at the centre of which is freely journalled a four-bladed propeller having a diameter considerably greater than that of the fog head. The radially inner parts of the blades corresponding, for example, to the fog head diameter, may be perforated.

In operation part of the liquid stream leaving the fog head impinges against the propeller blades and thereby rotates the blade member. Under the action of said member this part of the liquid is spread in the manner of a cone of liquid droplets having an apex angle which may be in the region of 90°. Another part of the liquid stream passes generally axially through the blade member between the inner portions of the blades and through the perforations therein, and the remainder fills the space between the outer cone and the central part. In this way it is possible to project a widely divergent stream of fog-foam over an area extending up to 50 feet from the nozzle and having an angle of or approaching 90°. Such an arrangement would be of considerable advantage in the case of burning liquids from, for example, crashed aircraft.

The casing surrounding the fog head may have a diameter of about three times that of the fog head and the blade member a diameter about twice that of said fog head.

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Printed for Her Majesty's Stationery Office by Wickes & Andrews, Ltd., E.C.4. 684/2.—1956.
Published at The Patent Office, 25, Southampton Buildings, London, W.C 2, from which copies may be obtained.

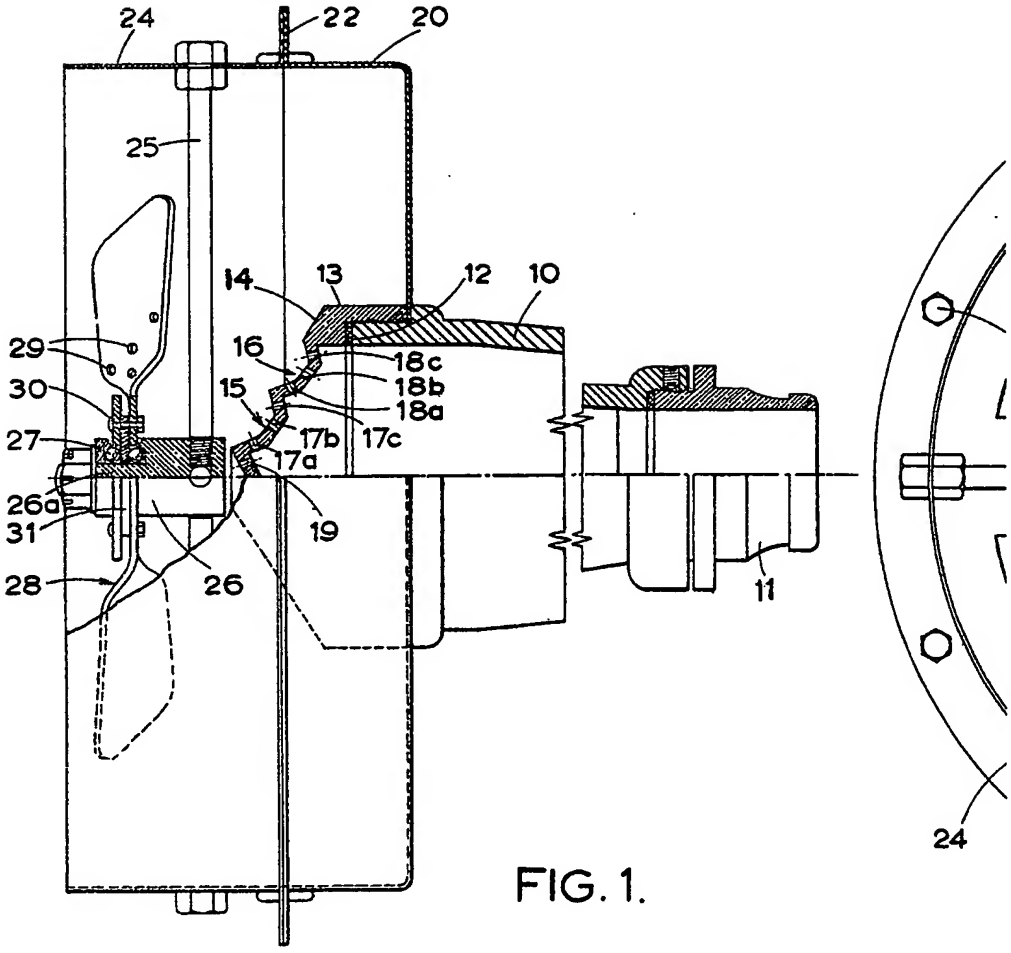
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FIG. 1.

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1 SHEET

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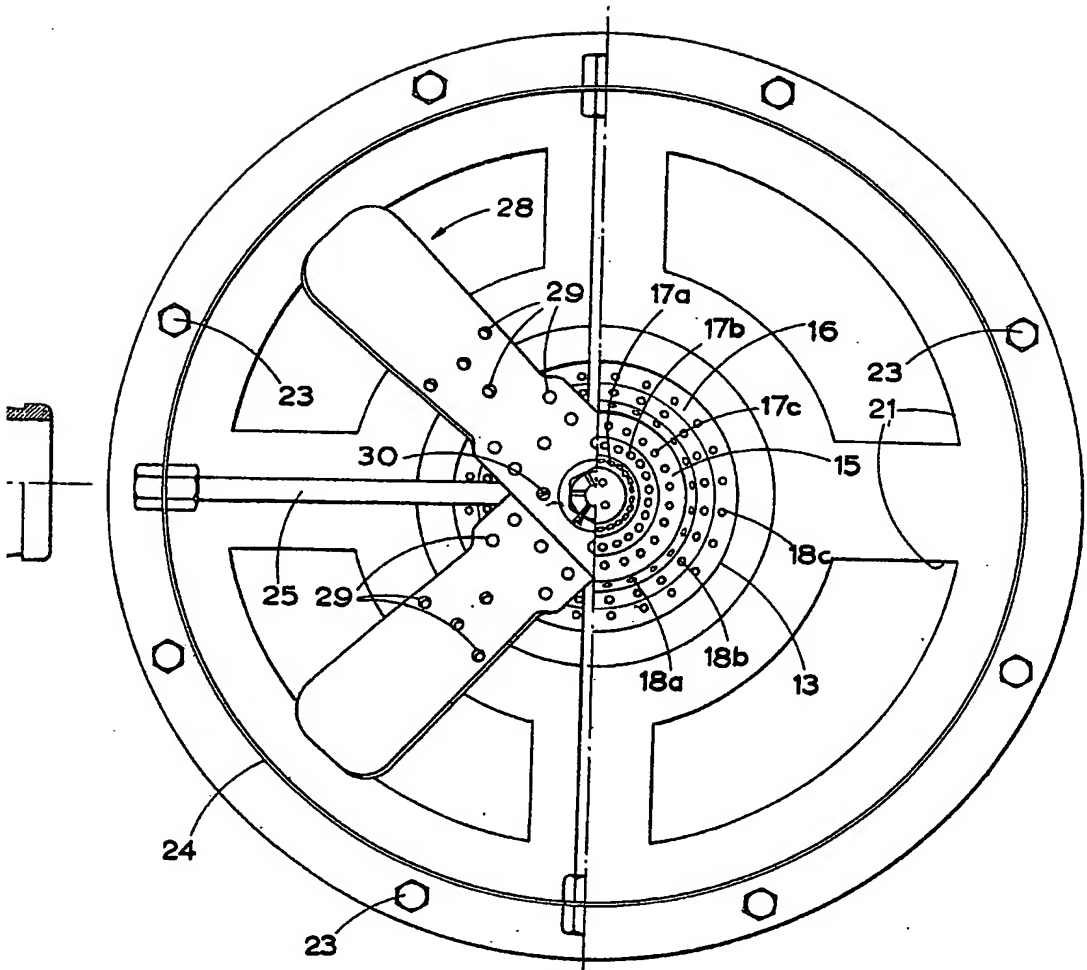

FIG. 2.

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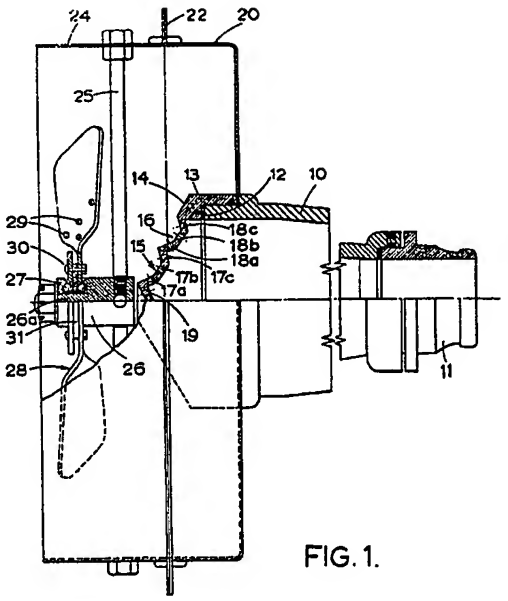

FIG. 1.

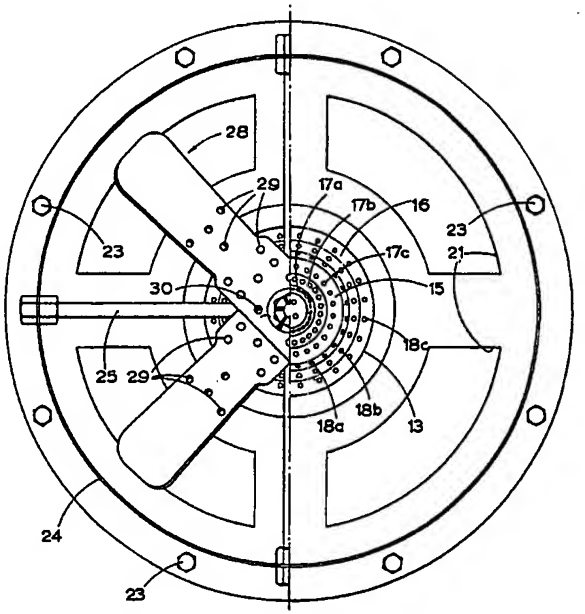

FIG. 2.